EPA Region 7 TMDL Review

TMDL ID:	KS-UR-14-228-2a	**Waterbody ID:**	KS-UR-12-228_1, KS-UR-12-228_2, KS-UR-12-228_9, KS-UR-13-228_2, KS-UR-13-228_3, KS-UR-13-228_4, KS-UR-13-228_7, KS-UR-14-W010_ 2
Waterbody Name:	BEAVER CREEK -- FLUORIDE		
Tributary:	SEE (ENCLOSURE A) FOR TRIBUTARIES COVERED UNDER THIS TMDL		
Pollutant:	FLUORIDE		
State:	KS	**HUC:**	10250014, 10250013, 10250012
BASIN:			
Submittal Date:	6/30/2006		
Approved:	Yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

Letter, dated June 30, 2006, and received by EPA on June 30, 2006, formally submitted this TMDL for approval under Section 303(d).

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

Violations of the criteria occur within the flow range of 0.5 - 35 cfs over all three defined seasons, Winter: November-March, Spring: April-July, Summer-Fall: August-October (Figure 5). Fluoride concentrations averaged below the 1 mg/l irrigation criterion at flows below mean flow.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

1 mg/L for Agricultural Water Supply (Irrigation) Use, 2 mg/L for Livestock and Domestic Water Supply (KAR 28-16-28e(c)(l)). This segment is designated for the following in Kansas: Special Aquatic Life Support, Primary Contact Recreation (C), Domestic Water Supply; Food Procurement; Ground Water Recharge; Industrial Water Supply Use; Irrigation Use; Livestock Watering Use.

Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

Kansas Implementation Procedures for Surface Water allow for a background to be established when the monitoring record indicates that the existing criteria is unachievable due to naturally occurring conditions. The specific stream criteria to supplant the existing criteria will be developed concurrent with Stage One of this TMDL following the appropriate administrative and technical Water Quality Standards processes for Site 226 based on currently available information and will be 1.3 mg/L (reflecting the averages during the winter greater than median flow) from data collected over 1986-2005 (Figure 5). Future TMDL assessment will be based on this proposed background criteria.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

Significant irrigation activity associated with corn production occurs in the Arikaree basin in Colorado. Irrigation water is drawn from deepwater wells that tap the High Plains Aquifer. There are three NPDES permitted dischargers within the Beaver Creek watershed (Figure 1), all of them located in the lower portion of the stream system. None of the facilities contribute enough flow to deliver loads down to the Cedar Bluffs monitoring site.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

Fluoride is chiefly contributed by the discharges of High Plains - Ogallala ground water to the Beaver Creek channel under favorable conditions. These elevated fluoride levels tend to be commonly seen through out northwest Kansas, southwest Nebraska and northeast Colorado. Based upon observations provided by the Kansas Geological Survey, the source of the dissolved fluoride in the river water is likely water from the Ogallala-High Plains aquifer discharged to the river either from elevated groundwater levels, baseflow contributions after runoff events, or return flows from irrigated lands.

WLA Comment

Current Wasteload Allocations will be set for Hemdon and Atwood, based on their average source water content of fluoride and the design flows of their wastewater treatment facilities. Therefore, Herndon will receive a Wasteload Allocation of 0.2 pounds per day of fluoride, while Atwood will receive an allocation of 1.9 pounds per day. Neither point source with active discharge is seen as a main contributor to the elevated fluoride seen at higher flows. There will be a Wasteload Allocation of zero for Finley Construction.

LA Comment

The majority of the fluoride load in Beaver Creek appears to be background in nature. At site 228, the Load Allocation based on the existing fluoride criteria of 1.0 mg/L across all flow conditions is shown in a load duration curve and is 18.4 pounds per day of fluoride at the mean daily flow of 3.4 cfs. The LA at station 228 will increase if the elevated background concentration (1.3 mg/L) becomes the applicable criteria (23.9 lbs/day at mean daily flow of 3.4 cfs).

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The irrigation water use standard of 1.0 mg/L is extremely conservative considering it was developed for fluoride toxicity in acid soils. The soils in Rawlins and Decatur Counties are neutral to alkali (pH 6.1 - 9.0) and should effectively inactivate fluoride applied in irrigation water at the levels found in the river. Exceedances of the 1 mg/l criterion have not precluded surface water irrigation use, provided there is water available for irrigation, as evidenced by the small reach above Atwood where surface irrigation has been ongoing for years that would be impacted by the fluoride in the Arikaree River

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

Seasonal variation has been incorporated in this TMDL through the documentation of the elevated fluoride levels during spring when flows are typically the highest.

Public Participation

Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

Public meetings to discuss TMDLs in the Upper Republican Basin were held March 2, 2006 in Atwood. An active Internet Web site was established at http://www.kdheks.gov/tmdl/index.htm to convey information to the public on the general establishment of TMDLs and specific TMDLs for the Upper Republican Basin. Public Hearing: Public Hearings on the TMDLs of the Upper Republican Basin were held in Atwood on March 2, 2006.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

KDHE will continue to collect bimonthly samples at Station 228, including fluoride samples, in each of the three defined seasons.

Reasonable assurance

Reasonable assurance only applies when reductions in nonpoint source loading is required to meet the prescribed waste load allocations.

Point sources are not causing of contributing to the impairment as evidenced by the range of flows showing impairments (moderate flows). If point source were causing the impairment, the exceedences would be evident at low flows.